

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A power supply apparatus, comprising:

a switching regulator which performs start and stop operations in response to a first control signal and generates a first constant voltage in response to a first voltage switching signal to output the first constant voltage;

a series regulator which performs start and stop operations in response to a second control signal and generates a second constant voltage in response to a second voltage switching signal to output the second constant voltage; and

a controller which generates the first and second control signals and the first and second voltage switching signals, controls the switching regulator and the series regulator to simultaneously operate for at least a predetermined time period using the first and second control signals, respectively, and controls the switching regulator and the series regulator such that the first output voltage of the switching regulator is greater than the second output voltage of the series regulator using the first and second voltage switching signals.

2. The power supply apparatus as defined in claim 1,

wherein the controller generates a third control signal and a third voltage switching signal.

3. The power supply apparatus as defined in claim 2,

wherein the series regulator includes a plurality of series regulators and the controller selectively activates the plurality of series

regulators using the third control signal and the third voltage switching signal.

4. The power supply apparatus as defined in claim 3,

wherein at least one of the plurality of series regulators is a low-current-consuming series regulator that consumes less power less than the rest of the plurality of series regulators and the controller activates the low-current-consuming series regulator in a low-consuming-current mode of the apparatus.

5. A power supply apparatus which supplies different output voltages to a plurality of electric loads, comprising:

a switching regulator which performs start and stop operations in response to a first control signal and generates a first constant voltage in response to a first voltage switching signal to output the first constant voltage to one of the plurality of electric loads;

a series regulator which performs start and stop operations in response to a second control signal and generates a second constant voltage in response to a second voltage switching signal to output the second constant voltage to another one of the plurality of electric loads; and

a controller which generates the first and second control signals and the first and second voltage switching signals, controls the first and second voltage switching signals such that the first constant voltage of the switching regulator is greater than the second constant voltage of the series regulator, and controls the switching regulator and the series regulator such that the first output voltage of the switching regulator is greater than the second output voltage of the series regulator using the

first and second voltage switching signals during a time the switching regulator and the series regulator simultaneously operate.

6. A power supply apparatus, comprising:

switching regulating means for performing start and stop operations in response to a first control signal and generating a first constant voltage in response to a first voltage switching signal to output the first constant voltage;

series regulating means for performing start and stop operations in response to a second control signal and generating a constant voltage in response to a second voltage switching signal to output the constant voltage; and

controlling means for generating the first and second control signals and the first and second voltage switching signals, controlling the switching regulating means and the series regulating means to simultaneously operate for at least a predetermined time period using the first and second control signals, respectively, and controlling the switching regulating means and the series regulating means such that the first output voltage of the switching regulating means is greater than the second output voltage of the series regulating means using the first and second voltage switching signals.

7. The power supply apparatus as defined in claim 6,

wherein the controlling means generates a third control signal and a third voltage switching signal.

8. The power supply apparatus as defined in claim 7,

wherein the series regulating means includes a plurality of series regulating means, and the controlling means selectively activates the

plurality of series regulating means using the third control signal and the third voltage switching signal.

9. The power supply apparatus as defined in claim 8,

wherein at least one of the plurality of series regulating means is a low-current-consuming series regulating means for consuming less power than the rest of the plurality of series regulating means and the controlling means activates the low-current-consuming series regulating means in a low-consuming-current mode of the apparatus.

10. A power supply apparatus which supplies different output voltages to a plurality of electric loads, comprising:

a switching regulating means for performing start and stop operations in response to a first control signal and generating a first constant voltage in response to a first voltage switching signal to output the first constant voltage to one of the plurality of electric loads;

a series regulating means for performing start and stop operations in response to a second control signal and generating a second constant voltage in response to a second voltage switching signal to output the second constant voltage to another one of the plurality of electric loads; and

a controlling means for generating the first and second control signals and the first and second voltage switching signals, controlling the first and second voltage switching signals such that the first constant voltage of the switching regulating means is greater than the second constant voltage of the series regulating means, and controlling the switching regulating means and the series regulating means such that the first output voltage of the switching regulating means is greater than the second output voltage of the series regulating means using the

first and second voltage switching signals during a time the switching regulating means and the series regulating means simultaneously operate.

11. A power supply method, comprising the steps of:

generating a first control signal for turning on and off a switch regulator;

generating a second control signal for turning on and off a series regulator;

controlling the first and second control signals to activate the switching regulator and the series regulator in at least a predetermined time period;

generating a first voltage switching signal for turning on and off the switch regulator;

generating a second voltage switching signals for turning on and off the series regulator; and

controlling the first and second voltage switching signals such that the first output voltage of the switching regulator is greater than the second output voltage of the series regulator.

12. The power supply method as defined in claim 11,

wherein the series regulator includes a plurality of series regulating circuits and the first and second controlling steps selectively activate one of the plurality of series regulating circuits.

13. The power supply method as defined in claim 12,

wherein at least one of the plurality of series regulating circuits is a low-current-consuming series regulating circuit which consumes less power than the rest of the plurality of series regulating circuits and the first and second controlling steps activate the low-current-consuming series regulating circuit in a low-consuming-current mode of the apparatus.

14. A power supply method, comprising the steps of:

generating a first control signal for turning on and off a switch regulator;

generating a second control signal for turning on and off a series regulator;

generating a first voltage switching signal for turning on and off the switch regulator;

generating a second voltage switching signal for turning on and off the series regulator; and

controlling the first control signal and the first voltage switching signal to activate the switching regulator and the second control signal and second voltage switching signal to activate the series regulator,

wherein the control step controls the first and second control signals to activate the switching regulator and the series regulator for at least a predetermined time period.

15. The power supply method as defined in claim 14,

wherein the controlling step controls the first and second voltage switching signals such that the first output voltage of the switching

regulator is greater than the second output voltage of the series regulator.

16. A power supply method, comprising the steps of:

generating a first control signal for turning on and off a switch regulator;

generating a second control signal for turning on and off a series regulator;

generating a first voltage switching signal for turning on and off the switch regulator;

generating a second voltage switching signals for turning on and off the series regulator; and

controlling the first control signal and the first voltage switching signal to activate the switching regulator and the second control signal and second voltage switching signal to activate the series regulator,

wherein the controlling step controls the first and second voltage switching signals such that an output voltage of the switching regulator is greater than an output voltage of the series regulator.